Cerebrospinal Fluid Research

Poster presentation

Controversies about adjustable shunts

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Background

The development of valves for the optimal treatment of patients with hydrocephalus is an ongoing challenge for decades. Over drainage and reliable long-term performance has been the focus for the different engineering teams. The so called Anti-Siphon-Device, flow reducing devices like the Orbis-Sigma-Valve or the Siphon-Guard and Gravitational shunts are still competing in respect to superior long term survival. On the other hand the requirement of non-invasive readjustment depending on the clinical aspects of the individual patient has led to several new developments. Whether or not adjustable valve could lower the likelihood of revisions could up to now not be shown in clinical trials. What are the options for a combination of adjustability on the one hand and over drainage avoiding devices on the other?

Materials and methods

All available shunts can be divided in two groups: traditional differential pressure valves and devices to avoid complications followed by over drainage. The only type of valve, which can be non-invasively readjusted, is the differential pressure valve. However, these devices do not take into account posture depending aspects in the shunt systems, which obviously are the reason for over drainage related complications. The systematic analysis of all available shunt-technology demonstrates the important range of therapeutic options, which have not been realized yet. Adjustable Anti-Siphon-Devices, adjustable flow-reducing devices or gravitational shunts are not on the market. Taking into account well known drawbacks of available adjustable DP-valves these devices promise to introduce further improvement for the treatment of hydrocephalus. This can be supported by analytical and experimental investigations.

Results and conclusion

The adjustability of Anti-Siphon-Devices seems to be impossible: neither the adjustment of the influence of the subcutaneous pressure nor the adjustment of the height of implantation can be realized. The adjustment of flow-reducing devices is theoretical possible. However, technically this approach is an enormous challenge. The realisation of an independent readjustment for the lying and the upright position of the patient is unrealistic. However, the adjustment of the posture activated gravitational part is possible and promises another step into the direction of further improvement.